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REMARKS:

The remarks presented herein are believed to be fully responsive to the Office Action dated February 24, 2010, the period for response being extended via the petition and fee for a three month extension of time.

Claims 50-52, 56, 58, 62, 67 and 92-133 are pending in the application and claims 50-52, 67, 92, 94, 97, 99-103, 105, 106, 108 and 109 have been amended and new claims 110-133 have been added. Claims 67, 101, 103 and 108 were amended and new claims 110-114 and 117-124 were added to at least partially break up the Markush groups in claims 67, 101, 103 and 108. The amendments and new claims are fully supported in the specification and drawings as originally filed. No new matter has been added.

Applicants have amended the specification to reflect a change in priority claim so that the present application does not claim priority as a continuation-in-part to U.S. patent application Serial No. 08/023,918 filed February 26, 1992. A Supplemental Application Data Sheet is attached that sets forth the new claim of priority.

Applicants respectfully submit that the Office Action has failed to establish a prima facie case of obviousness of the presently claimed invention, as discussed below. Applicants further submit that there is an abundance of objective evidence of the non-obviousness of the claimed invention, as also discussed below. Applicants submit herewith the declaration of Dr. Niall R. Lynam under 37 CFR §1.132, along with Lynam Exhibits A-E, in support of Applicants' discussions below.

Claim Rejections:

Claims 50, 52, 56, 58, 62 and 67 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, U.S. Patent No. 5,289,321, in view of Fukuhara, U.S. Patent No. 4,653,316, and in further view of Nishimura et al., U.S. Patent No. 4,713,685, while claim 51 was rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Fukuhara and

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Nishimura, and in further view of Tuck, U.S. Patent No. 4,772,942. Claims 92-99 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Tuck and in further view of Nishimura, while claims 100-109 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Tuck and Nishimura, and in further view of Kishi et al., U.S. Patent No. 5,414,461.

Applicants respectfully traverse the rejections under 35 U.S.C. §103(a) for at least the reasons set forth below. However, and solely to expedite prosecution and allowance of the claims and without acquiescing to the rejections in any way, Applicants have clarified independent claims 50, 92, 99, 102 and 105 as set forth above and submit that claims 50-52, 56, 58, 62, 67 and 92-109 are in condition for allowance.

Applicants have clarified independent claim 50 to clarify that image data captured by the two image capture devices are processed by the image processor, with the image processor producing a synthesized image from the image data captured by the two image capture devices, and with the synthesized image comprising a composite image of the image data captured by the two image capture devices without duplication of image information. The displayed image displayed on the single display screen includes an image portion from an image captured by each of the two image capture devices. Independent claims 92, 99, 102 and 105 have been clarified in a similar manner. Independent claims 92, 99 and 102 have also been clarified to clarify that the center image capture device is mounted at a center rear portion of the vehicle between the side image capture devices.

Office Action:

The Office Action rejects all of the claims pending in the application. However, the Office Action fails to address several limitations in the independent claims and in the dependent claims. For example, the Office Action fails to address the limitations of claim 67, which include: "wherein at least one of (a) said fields of view of said two image capture devices are dynamically adjustable, (b) said fields of view of said two image capture devices are dynamically adjustable at least as a function of vehicle speed, and (c) wherein said two image capture devices have variable

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exposure periods." In rejecting claim 67, the Office Action merely states: "note the examiners rejection for claim 50". Applicants submit that claim 50 does not include the limitations of claim 67, nor were these limitations discussed in the Examiner's rejection for claim 50.

In addition to the above, the Office Action does not address some of the limitations set forth in the Markush listings in claims 67, 101, 103 and 108, and these limitations are now individually set forth in new claims 110-114 and 117-124. Consideration and allowance of these claims is respectfully requested.

Rejection of Independent Claim 50:

With respect to the rejection of independent claim 50, Applicants submit that the combination of Secor and Fukuhara and Nishimura does not disclose or suggest (separately or taken in combination together) or render obvious the claimed vision system for at least the reasons set forth below and set forth in the previous responses dated October 15, 2008 and April 3, 2009. Applicants submit that (a) Neither Secor nor Nishimura nor Fukuhara (separately or taken in combination together) discloses or suggests displaying a synthesized image from two or more cameras on a single display screen; (b) Secor discloses a display screen that is switched between a side-rear view camera 22 and a side-looking camera 34; (c) Fukuhara (separately or taken in combination with other applied art) does not disclose or suggest a vision system that displays images by two image capture devices; (d) Fukuhara (separately or taken in combination with other applied art) does not disclose image capture devices with overlapping fields of view; (e) Fukuhara (separately or taken in combination with other applied art) does not disclose or suggest an image processor that produces a synthesized image; (f) Neither Secor nor Fukuhara nor Nishimura (separately or taken in combination with other prior art of record) discloses or suggests an image processor that produces a synthesized image from image data captured by two image capture devices, with the synthesized image comprising a composite image of the image data captured by the two image capture devices without duplication of image information; and (f) Neither Secor nor Fukuhara nor Nishimura (separately or taken in combination with other prior art of record) discloses or suggests such a synthesized image displayed on a single display screen that is

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viewable by a driver of the vehicle when the driver is normally operating the vehicle, and with the displayed synthesized image including an image portion from an image captured by each of the two image capture devices.

The Office Action makes a similar rejection as previously made, this time citing to Nishimura instead of Choi for allegedly disclosing an image displayed on a single display screen. Particularly, the Office Action, at page 3, now cites to Nishimura for disclosing "an image displayed on a single display screen viewable by a driver, wherein the image includes a portion from each of the capture devices." Applicants respectfully traverse. Independent claim 50 includes (a) an image processor producing a synthesized image from image data captured by two image capture devices, with the synthesized image comprising a composite image of the image data without duplication of image information, (b) a display screen displaying said synthesized image, (c) said synthesized image displayed as a single image on a single display screen that is viewable by a driver of said vehicle when the driver is normally operating said vehicle, (d) wherein the displayed image displayed on said single display screen includes an image portion from an image captured by each of said two image capture devices, and (e) said image processor processing said image data by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation and image warping compensation.

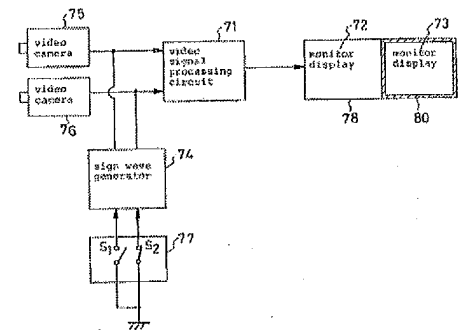
Nishimura Does Not Disclose or Suggest a Synthesized Image Comprising Merged Images:

In stark contrast to the presently claimed invention of independent claim 50, Nishimura merely discloses use of a wide display for displaying two separate, distinct, isolated images.¹ The images are captured from opposite sideward facing cameras (see column 4, lines 36-41 of Nishimura). The images are not merged into one synthesized image. The separate and distinct images are displayed on both sides of the display, which is divided by a vertical center line (see column 2, lines 26-29 of Nishimura). To further separate and isolate the separate images from one another, a switch is responsive to a turn signal of the vehicle being operated and

¹ *Lynam Declaration*, pars. 33 and 34.

FIG. 7

issues a signal for displaying a flashing sign on the frame part (80) of the display (78) at the respective separate and distinct image (72, 73). See column 7, lines 6-28, and Figure 7 of Nishimura, reproduced to the right.



Thus, Nishimura teaches away, in isolation and in combination with the applied art, from the presently claimed invention. Nishimura only teaches use of oppositely directed side cameras with no overlapping fields of view and with no center rearward facing camera. By definition, such divided separate images from oppositely directed cameras mounted on opposing sides of the vehicle, and with the vehicle disposed therebetween, cannot have overlap in the fields of view as disclosed and claimed in the present application.² Nishimura does not disclose or suggest merging or stitching or synthesizing of images captured by the oppositely facing cameras, particularly in the manner claimed herein. Moreover, the displayed separate and distinct images of Nishimura are divided by a vertical center line and thus are not synthesized and displayed as a single composite image in the claimed manner.³ Thus, Nishimura not only fails to disclose or suggest the aspects of the present invention alleged in the Office Action, but Nishimura teaches away from the claimed invention so that one of ordinary skill in the art at the time of the Schofield et al. invention, when viewing Nishimura (either alone or in combination with Secor and/or Fukuhara) would not have arrived at the claimed Schofield et al. invention, at least not without using the Schofield et al. disclosure as a template, which would require use of impermissible hindsight.

Thus, clearly Nishimura, either alone or in combination with other cited art of record, does not disclose or suggest a display screen displaying a synthesized image from image data captured by two image capture devices with overlapping fields of view. To the contrary, Nishimura discloses two separate images of areas at opposite sides of the vehicle, with the displayed separate images providing distinct and separate views of distinct and separate regions

² Lynam Declaration, par. 34.

³ Lynam Declaration, par. 33.

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exterior the vehicle, and with the displayed separate images clearly providing respective views from separate and distinct respective locations.

Thus, Nishimura (separately or taken in combination with other applied art) does not disclose or suggest the elements of the claimed invention that are clearly missing from (and as acknowledged in the Office Action) Secor or Fukuhara. Thus, even if the teachings of Secor and Fukuhara were combined with one another (which there is no motivation to do since one is a vision system for a vehicle and the other is a laser system for analyzing a road surface, as discussed below) and further combined with Nishimura, the combination would fail to lead one of ordinary skill in the art to arrive at the presently claimed invention, without using the present application as a template.⁴

As discussed below and in the previous responses, the Office Action again misinterprets the teachings of Fukuhara and improperly combines those teachings with the teachings of Secor (and now Nishimura). Such a combination is improper and, even if made, the combination (with Nishimura) falls well short of establishing a *prima facie* case of obviousness of the presently claimed invention.

Secor Discloses, at a Given Time, Display of a Single Image From a Single Camera:

The Office Action merely points to Figures 2 and 4 of Secor (reproduced to the right), and asserts that the cameras have overlapping fields of view, and that it would be obvious to combine the teachings of Secor, Fukuhara and Nishimura to arrive at the presently claimed invention. Applicants respectfully traverse.

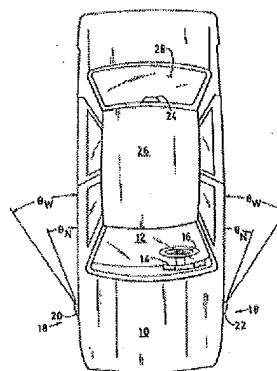


FIG. 2

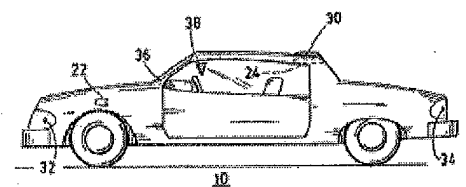


FIG. 4

⁴ Lynam Declaration, pars. 34, 42 and 44-47.

Secor discloses multiple cameras and multiple display screens, with each of the display screens displaying an image from a respective camera. Secor clearly teaches towards use of a display screen to display an image from only a single camera at a given time, and thus (when viewed separately or taken in combination with other applied art) teaches away from displaying a synthesized image displayed on a single display screen that is viewable by a driver of said vehicle when the driver is normally operating said vehicle, with the synthesized image being produced by an image processor from image data captured by two image capture devices and with the synthesized image comprising a composite image of the image data without duplication of image information, and with the displayed image displayed on the single display screen including an image portion from an image captured by each of the two image capture devices, such as is clearly set forth in independent claim 50.⁵

Clearly and unequivocally, Secor distinguishes side-rear view camera 22 from side-looking camera 34. This is plain from simply looking at the Figures of Secor (such as Figure 3, reproduced to the right), and it is also plain and unequivocal from the description of Secor and how Secor describes and distinguishes the function of

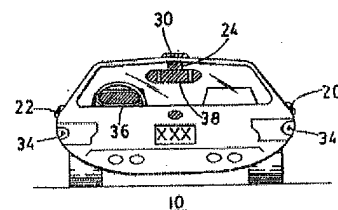


FIG. 3

camera 22 from the function of camera 34. Secor also discloses that the display screens 42 can be **switched between** the side-rear view camera assembly 22 and the side-looking camera assembly 34 (see column 5, lines 34-41 of Secor). For example, and as clearly disclosed in Secor, the "switching of the screens back from the camera assemblies 34 to the side camera assemblies 20 and 22 occurs automatically, for example, if the vehicle is shifted out of reverse into a forward speed" (see column 5, lines 37-41 of Secor). Thus, clearly, the display screen 42 only displays an image from **one** of the cameras at a given time, and the image captured from **either** the side-rear view camera (22) **or** the side-looking camera (34) is shown on the display screen (42), but the system of Secor **never** shows images from **both** cameras **at the same time on**

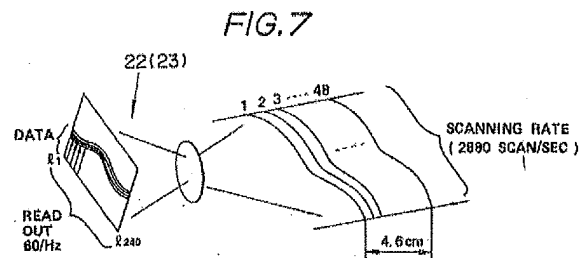
⁵ *Lynam Declaration*, par. 31.

the same screen,⁶ and thus whether or not there is overlap in the fields of view between camera 22 and camera 34 is moot with regards to what Secor teaches, discloses or suggests.

Thus, Applicants submit that Secor, either alone or in combination with Fukuhara and/or Nishimura and/or other prior art of record, does not disclose or suggest or render obvious the claimed invention, and Secor teaches away from a vision system having two image capture devices with overlapping fields of view, and with the synthesized image comprising a composite image of the image data captured by two or more image capture devices without duplication of image information.⁷ Moreover, an artisan armed with Secor would not experience or see the problem seen and solved by Schofield et al., and thus such an artisan would have no motivation to combine Secor with, for example, Nishimura and/or Fukuhara, to attempt to arrive at the presently claimed invention, given that Secor teaches away from the problem seen and solved by Schofield et al.⁸

Fukuhara Discloses a Laser Scanning Apparatus for Detecting Road Surface Conditions:

The Office Action also relies on the road surface condition measurement and analysis system of Fukuhara in combination with the wide display monitor system of Nishimura and the multi-camera system of Secor, and simply states that it would have been obvious to combine the teachings of these references to arrive at the claimed invention. Applicants again respectfully traverse for at least the reasons previously stated in prior responses. Fukuhara does not disclose a display that displays images captured by the cameras. The cameras 22, 23 of Fukuhara capture the scanning locus of the laser beam for producing a transverse profile data of the road surface. This is shown in Figure 7 of Fukuhara (reproduced to the right), where the camera 22(23) captures multiple transverse road profiles as the laser is scanned across



⁶ Lynam Declaration, par. 32.

⁷ Lynam Declaration, pars. 42 and 44-47.

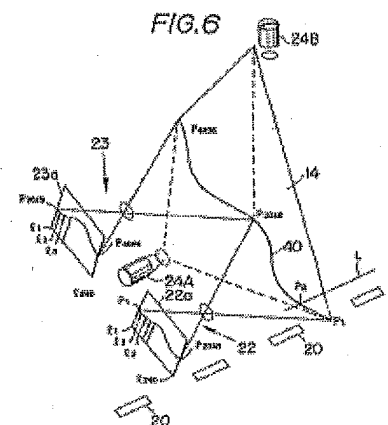
⁸ Lynam Declaration, pars. 42 and 44-47.

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the road surface in front of the camera (column 3, line 61 to column 4, line 7 of Fukuhara). The road profile data of the respective cameras are synthesized into a picture image representing the cross-sectional profile of the road (column 4, lines 22-24 of Fukuhara). The data regarding the transverse profile, cracks and the longitudinal profile are recorded on the VTR (column 6, lines 3-5 of Fukuhara), and "the data stored in the memory devices is converted into binary values in the processor 40 in accordance with a threshold value L_s shown in FIG. 13 so that the position of the crack is judged in accordance with data less than the threshold value L_c ." (column 6, lines 16-20 of Fukuhara). "The result of judgment is displayed on display means, not shown such as a cathode ray tube" (column 6, lines 20-22 of Fukuhara). There is no disclosure in Fukuhara as to where this display means is located (it may be remote from the vehicle for later analysis of the processed data), and clearly there is no disclosure in Fukuhara that the display means displays images, since the display means is clearly for displaying the result of the judgment of the position of the crack.⁹

As also disclosed in Fukuhara, the laser beam scanning apparatus includes two television cameras that are directed at a 60 degree downward angle for catching the locus of the laser beam on the road surface and reflected light. The cameras have non-overlapping fields of view such that the cameras 22, 23 pick up the scanning loci 40 of the laser beam respectively in the range of positions $P_1 - P_{2048}$ and $P_{2049} - P_{4096}$ (see column 3, lines 56-60 of Fukuhara and see Figure 6 of Fukuhara, reproduced to the right).

Thus, Fukuhara displays a result of judgment of the position of the crack based on processing of binary values of the data stored in the memory devices. There is absolutely no disclosure or suggestion in Fukuhara of displaying images on a video display screen, and particularly there clearly is no disclosure or suggestion in Fukuhara of a synthesized image displayed as a single image on a single display screen that is viewable by a driver of the



⁹ Lynam Declaration, pars. 35-38.

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vehicle when the driver is normally operating the vehicle.¹⁰ To the contrary, Fukuhara discloses an apparatus for detecting and analyzing cracks in a road surface. Thus, one of ordinary skill in the art would have no motivation to combine Fukuhara with, for example, Secor and/or Nishimura, to attempt to arrive at the presently claimed invention, given that Fukuhara does not teach use of a display viewable by the driver of the vehicle and clearly teaches away from the problem seen and solved by Schofield et al.¹¹

In stark contrast to the apparatus of Fukuhara, the presently claimed invention of independent claim 50 includes an image processor that produces a synthesized image from image data captured by two image capture devices with the synthesized image comprising a composite image of the image data without duplication of image information. The image processor processes the image data by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation. Nowhere in Fukuhara can the Applicants find disclosure or suggestion of these image processing techniques.

In support of the combination of Fukuhara with Secor and Nishimura, the Office Action states that Fukuhara discloses an image processor producing a synthesized image. However, Applicants again submit that the interpretation of Fukuhara set forth in the Office Action is fundamentally flawed. On page 3 of the Office Action, the Examiner states:

To help alleviate this problem,

Fukuhara discloses "an image processor producing a synthesized image from the outputs of the image capture devices by at least one of: luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation, or image warping compensation" (Fukuhara: figures 4 and 8; column 4, lines 13-26)

¹⁰ *Lynam Declaration*, par. 35.

¹¹ *Lynam Declaration*, pars. 42 and 44-47.

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To the contrary, neither Figures 4 and 8 nor column 4, lines 13-26, of Fukuhara disclose or suggest this. Column 4, lines 13-26 of Fukuhara merely states that "the data read out from respective television cameras are applied to the synthesizing circuit 33, where the data are synthesized in a manner to be described later and then recorded on a VTR 35." Contrary to the assertions in the Office Action, Fukuhara is wholly silent as to a disclosure or suggestion of an image processor that processes image data captured by the image capture devices by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation. Such processing clearly is not described at column 4, lines 13-26 or Figures 4 or 8 of Fukuhara, or for that matter, elsewhere in Fukuhara.¹²

Applicants submit that Fukuhara (when viewed separately or taken in combination with other applied art) does not disclose or suggest the synthesized image and image processing techniques of the presently claimed vision system, but rather discloses a laser beam scanning apparatus for detecting road surface conditions. Fukuhara does not display an image on a display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. To the contrary, the television cameras of Fukuhara catch the locus of a laser beam on the road surface to determine the cross-sectional profile of the road surface. The data regarding the transverse profile are recorded on a VTR and the stored data is converted into binary values in the processor in accordance with a threshold value so that the position of a crack is judged in accordance with data that is less than a threshold value. Fukuhara discloses that the *result of the judgment* (of the position of the crack) is displayed on display means (see column 6, lines 3-23 of Fukuhara). Thus, Applicants submit that nowhere in Fukuhara is there a disclosure or suggestion that images are captured and displayed to the driver of vehicle, and clearly there is no disclosure or suggestion in Fukuhara that a synthesized *image* is displayed on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, with the

¹² *Lynam Declaration*, pars. 36 and 37.

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displayed synthesized image displayed on a single display screen and including an image portion from an image captured by each of two image capture devices.

As stated in previous Responses, Applicants submit that Fukuhara (when viewed separately or taken in combination with other applied art) does not disclose or suggest cameras with overlapping fields of view and an image processor that synthesizes an image from image data captured by the two or more cameras. To the contrary, Fukuhara clearly discloses that each camera has a field of view that encompasses the scanning loci of the laser beam in the range of specific respective positions for each camera. Thus, Applicants submit that Fukuhara teaches away from a vision system having two image capture devices with overlapping fields of view, and with the synthesized image comprising a composite image of the image data captured by two or more image capture devices without duplication of image information, and with the image processor processing image data captured by the image capture devices by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation.¹³

No Prima Facie Case of Obviousness Established:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference or references when combined must teach or suggest all the claimed limitations. "Obviousness requires a suggestion of all the elements in a claim (*CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003)) and 'a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.' *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). Here, we find that the Examiner has not identified all the elements of claim 1, nor provided a reason

¹³ *Lynam Declaration*, pars. 36 and 37.

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that would have prompted the skilled worker to have arranged them in the manner necessary to reach the claimed invention."¹⁴

In the present case, the Office Action cites the non-related teachings of Fukuhara, Secor and Nishimura to allegedly arrive at the claimed invention. However, such a combination falls well short of disclosing all of the limitations of claim 50, and clearly such a combination and the support for the combination set forth in the Office Action fall well short of providing a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed invention does.

The fact finder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.¹⁵ "A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art."¹⁶ "It is the Examiner's burden to establish *prima facie* obviousness. Obviousness requires a suggestion of all the elements in a claim and 'a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.'"¹⁷ In order to establish a *prima facie* case of unpatentability, a showing that the prior art would have suggested making the specific modifications necessary to achieve the claimed invention is also required.¹⁸

As discussed above, Applicants submit that the Office Action has failed to establish a *prima facie* case of obviousness at least because (a) Secor discloses display of a single image on a respective display and does not disclose or suggest displaying a synthesized image comprised of two merged images on a single display; (b) Fukuhara discloses a laser beam

¹⁴ *Ex Parte Alexander*, 86 USPQ2d 1120, 1122 (BPAI 2007).

¹⁵ *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 82 USPQ2d 1385, 1397 (U.S. 2007).

¹⁶ *KSR*, 127 S.Ct. 1727, 82 USPQ2d at 1389.

¹⁷ *Ex Parte Alexander*, 86 USPQ2d 1120, 1122 (BPAI 2007), quoting *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741, 82 USPQ2d 1385 (2007), internal case cites omitted.

¹⁸ *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1359-60, 83 USPQ2d 1169, 1176-77 (Fed. Cir. 2007).

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scanning apparatus for detecting road surface conditions, with no display of captured images; (c) Nishimura discloses display of two separate, distinct images on a wide display where the separate images are selectively highlighted or framed or demarcated in response to actuation of a respective turn signal indicator; (d) there is no suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine the reference teachings to arrive at the claimed invention; (e) at the time of the invention, there would not have been a reasonable expectation of success in combining the prior art references; and (f) the prior art, taken as a whole, teaches away from the claimed invention.

The Office Action combines the non-displaying laser beam scanning apparatus of Fukuhara with the multiple camera system of Secor and the wide display of Nishimura and asserts that it would have been obvious to combine these teachings and that such a combination meets every limitation of the claimed invention. More particularly, the Office Action, at page 2, asserts that Secor allegedly discloses a first camera 22 with an overlapping field of view with a camera 34, and that Fukuhara allegedly discloses a synthesizing circuit that produces a synthesized output from the images received from the cameras 22 and 23, and that Nishimura allegedly discloses a single display screen viewable by a driver with the image including a portion from each of the capture devices, and thus, the combination of Secor, Fukuhara and Nishimura disclose the limitations as claimed. Applicants respectfully traverse.

As discussed in detail above, Fukuhara discloses a laser beam scanning apparatus for detecting road surface conditions, with no display of captured images. Fukuhara also discloses that each of its cameras has a field of view that encompasses the scanning loci of the laser beam in the range of specific respective positions for each camera, and thus Fukuhara does not disclose or suggest cameras with overlapping fields of view and teaches away from a vision system having two image capture devices with overlapping fields of view. Moreover, Fukuhara does not disclose or suggest an image processor that synthesizes an image from image data captured by the two or more cameras. Nor does Fukuhara disclose or suggest image processor that produces a synthesized image from image data captured by such cameras, with the synthesized image comprising a

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composite image of the image data without duplication of image information. Nor does Fukuhara disclose or suggest processing such image data by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation and image warping compensation.¹⁹

Likewise, Nishimura does not disclose or suggest cameras with overlapping fields of view. To the contrary, Nishimura clearly discloses that its system includes a first camera disposed at the left side of the vehicle and a second camera disposed at the right side of the vehicle, with the displayed images being displayed as separate and isolated images on a wide display. There is no disclosure or suggestion in Nishimura of multiple cameras having overlapping fields of view, nor is there a disclosure or suggestion in Nishimura of displaying on a single display screen a synthesized composite image produced from image data captured by two or more cameras in the claimed manner.²⁰

Secor merely discloses a vehicle having multiple cameras. Also, as discussed above, Secor teaches that the display may switch between the side-rear view camera 22 and the side-looking camera 34 to provide an image from one of the cameras for viewing by the driver of the vehicle. Thus, Applicants submit that Secor teaches that the camera 34 is directed sideways and its image may be displayed during backing maneuvers, and thus teaches away from a vision system having two image capture devices with overlapping fields of view and with a synthesized image of the image data captured by the two image capture devices being displayed on a single display screen for viewing by the driver of the vehicle, and with the synthesized image comprising a composite image of the image data without duplication of image information, and with the displayed image displayed on the single display screen including an image portion from an image captured by each of the two image capture devices.²¹

¹⁹ *Lynam Declaration*, pars. 35-38.

²⁰ *Lynam Declaration*, pars. 33 and 34.

²¹ *Lynam Declaration*, pars. 31 and 32.

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Thus, none of Secor, Fukuhara and Nishimura disclose the image processing and synthesized image and single display of such a synthesized image of the presently claimed invention. Moreover, one of ordinary skill in the art, armed with Secor, Fukuhara and Nishimura, would not have been motivated to modify the references or combine the references' teachings to arrange them in the manner necessary to reach the claimed invention. Nor would one of ordinary skill in the art at the time of the Schofield et al. invention have had a reasonable expectation of success in making such a combination.

In stark contrast to the systems of Secor and Fukuhara and Nishimura, the presently claimed invention of independent claim 50 provides a vision system having two image capture devices with overlapping fields of view, an image processor that produces a synthesized image from image data captured by the two image capture devices, with the synthesized image comprising a composite image of the image data without duplication of image information, and a display screen that displays the synthesized image, with the synthesized image being displayed on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, with the displayed image displayed on the single display screen including an image portion from an image captured by each of the two image capture devices, and with the image processor processing the image data by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation. Neither Secor nor Fukuhara nor Nishimura (when viewed individually or in combination with one another) discloses or suggests or renders obvious such a system. For example, neither Secor nor Fukuhara nor Nishimura discloses a vehicle having two image capture devices with overlapping fields of view, with an image processor that produces a synthesized image from image data captured by the two image capture devices, with the synthesized image comprising a composite image of the image data without duplication of image information. Nor is there disclosure or suggestion in Secor or Fukuhara or Nishimura of, for example, displaying such a synthesized image on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, with the displayed synthesized image displayed on the

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single display screen including an image portion from an image captured by each of the two image capture devices. Moreover, Applicants submit that Secor and Fukuhara and Nishimura teach away from such a vision system for at least the reasons set forth above.

Thus, one of ordinary skill in the art, armed with the teachings of Secor (and Fukuhara if one were to improperly use the teachings of Fukuhara to arrive at the claimed invention using impermissible hindsight reconstruction), would not look to the single display screen of Nishimura to alter its display features (since Nishimura also merely discloses display of separate and distinct captured images from separate cameras onto a wide display with no synthesizing of the images of image capture devices having overlapping fields of view), and even if such a combination of teachings were made, the skilled artisan would be led towards use of a wide display (such as of the type disclosed in Nishimura) that discloses two separate images of opposite side regions of the vehicle (since both Secor and Nishimura teach towards display of separate images on a respective display or respective portion of a display).

This is in stark contrast to, and teaches away from, the presently claimed invention, which has an image processor that produces a synthesized image from image data captured by two image capture devices having overlapping fields of view, with the synthesized image comprising a composite image of the image data without duplication of image information, and a display screen for displaying the synthesized image on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, with the displayed image displayed on said single display screen including an image portion from an image captured by each of the two image capture devices.

The results that would have been expected from the combination asserted by the Examiner would be to have a display means that displays judgment or analysis information, such as taught by Fukuhara (not images for viewing by a driver of the vehicle while operating the vehicle), or to have a separate display for each respective camera or a display that switches between cameras so that an image from only one camera is displayed on the display at a given time (such as taught by Secor), or to have two separate and distinct images (and not a synthesized

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composite image) displayed side-by-side and isolated or separated on a wide screen to provide views of the opposite side regions exterior the vehicle on the wide screen (such as taught by Nishimura).²² It would clearly have been unexpected to one of ordinary skill in the art, armed with the proposed combination of applied references, to provide a single display screen for displaying an image synthesized from image data captured by two or more cameras, with the synthesized image comprising a composite image of the image data without duplication of image information, and with the displayed image displayed on the single display screen including an image portion from an image captured by each of the two image capture devices.²³ Plainly, since an artisan armed with Secor would be switching the display between the cameras, there would not have been a motivation to combine the teachings of Secor with those of Nishimura (separate images on display) or Fukuhara (laser beam scanning apparatus for detecting road surface conditions, with no display of captured images).²⁴

As discussed in the previous responses, Secor merely discloses a display screen that displays an image captured by a respective camera and does not disclose or suggest a display screen for displaying an image synthesized from image data captured by two image capture devices, with the synthesized image comprising a composite image of the image data without duplication of image information, and with the display screen displaying the synthesized image on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, and with the displayed image displayed on the single display screen including an image portion from each of the two image capture devices. Moreover, Fukuhara does not disclose or suggest a display screen, particularly a display screen for displaying such a synthesized composite image as claimed herein, and Fukuhara does not disclose or suggest processing image data captured by two or more image capture devices to produce a synthesized image comprising a composite image of the image data without duplication of image information, with such processing comprising at least one technique chosen from luminant

²² *Lynam Declaration*, par. 41, 42 and 44-47.

²³ *Lynam Declaration*, par. 46.

²⁴ *Lynam Declaration*, par. 46.

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blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation and image warping compensation. Further, Nishimura plainly fails to remediate or fill in what is missing from Fukuhara and Secor, and merely discloses a wide display that displays separate and distinct and isolated images captured by separate and oppositely directed cameras.

In stark contrast to the systems of Fukuhara, Secor and Nishimura, the presently claimed invention of independent claim 50 includes an image processor that produces a synthesized image from image data captured by two image capture devices, with the synthesized image comprising a composite image of the image data without duplication of image information, and a display that displays the synthesized image on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, with the displayed image displayed on the single display screen including an image portion from an image captured by each of the two image capture devices. Clearly, the intent of the present invention is to display a single image that is representative of the combined fields of view of the two or more image capture devices in a manner that does not have duplication of displayed information and that provides an image as would be viewed from a single location and that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. Such a system is not disclosed or suggested in or rendered obvious by the disclosures of Fukuhara, Secor and/or Nishimura, either alone or in combination with one another or with other prior art of record.²⁵

Therefore, Applicants respectfully submit that the combination of Secor and Fukuhara and Nishimura does not disclose or suggest or render obvious the vision system of the presently claimed invention, particularly as set forth in independent claim 50 and the claims depending therefrom. Reconsideration and withdrawal of the rejection of claims 50-52, 56, 58, 61 and 67 is respectfully requested.

²⁵ *Lynam Declaration*, par. 40.

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Rejection of Dependent Claims 51, 52, 57, 58, 61 and 67:

Applicants submit that dependent claims 51, 52, 56, 57, 61 and 67 are patentable for at least the reasons set forth above with respect to independent claim 50.

With respect to the rejection of dependent claim 67, Applicants submit that neither Secor, nor Fukuhara, nor Nishimura, either alone or in combination with one another, discloses or suggests at least one of (a) said fields of view of said two image capture devices are dynamically adjustable, (b) said fields of view of said two image capture devices are dynamically adjustable at least as a function of vehicle speed, and (c) wherein said two image capture devices have variable exposure periods, such as clearly set forth in claim 67. Moreover, the Office Action did not address *any* of these limitations when rejecting claim 67. Rather, the Office Action merely stated: "Regarding claim 67, note the examiners rejection for claim 50." Claim 50 does not include any of the limitations (a), (b) and (c) of claim 67, nor did the Examiner's rejection for claim 50 discuss or address any of these limitations. The statement in the Office Action falls well short of the requirements for establishing a *prima facie* case of obviousness of a claimed invention. Applicants have amended claim 67 to include only the limitation (a) above and have added new claims 117 and 118 to separately include the limitations (b) and (c). Applicants submit that claims 67, 117 and 118 are allowable over the applied art and consideration of these claim limitations and withdrawal of the rejection of claim 67 is respectfully requested.

With respect to the rejection of dependent claim 51, this claim was rejected in view of the combination of Secor, Fukuhara, Nishimura and Tuck. Applicants submit that, contrary to what is asserted in the Office Action, Tuck does not disclose or suggest a synthesized image comprising two image portions arranged on a screen in the same orientation as respective locations of two image capture devices on the vehicle, wherein the image portions are reverse row sequenced from images captured by the respective ones of the two image capture devices, such as is claimed in dependent claim 51. In making the rejection, the Office Action states:

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Tuck teaches that there is a need in the art for the obviation of correction of distortion (Tuck: column 1, lines 40-45). To help alleviate this, Tuck discloses "the synthesized image comprises at least two image portions arranged on the screen in the same orientation as the locations of the capture devices wherein the image portions are reverse row sequenced" (Tuck: figure 4; column 4, lines 60-67, wherein reversed row processing is a well know technique when synthesizing image data). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to implement the processing taught by Tuck in order to obtain an apparatus that eliminates the distortion of an image.

Column 4, lines 60-67 of Tuck states:

In FIG. 4 there is shown a typical view of a scene obtained by the display system of FIG. 3, but in which each adjacent picture has been laid flat, for convenience of illustration only. It will be seen that the view is made up of four separately obtained pictures of the surrounding panorama, each picture obtained by a respective camera and displayed by a respective CRT and biocular magnifier 20, 21, 22 and 23. Although in the drawing,

The cited passage of Tuck merely states that each displayed picture is obtained by a respective camera and displayed by a respective CRT. Nowhere in Tuck, and particularly in the above referenced passage, is there a disclosure or suggestion of image portions of a displayed synthesized image being reverse row sequenced from images captured by the respective ones of the two image capture devices. The Office Action merely states that "reversed row processing is a well known technique when synthesizing image data", but cites to Tuck, which (as set forth above and as discussed in further detail below) discloses separate displays, each for displaying an individual image from a separate camera, without synthesizing of a composite image (and particularly without synthesizing of image data in the manner claimed herein), and without image portions being reverse row sequenced from images captured by respective cameras. Such a rejection again falls well short of the requirements for establishing a *prima facie* case of obviousness of a claimed invention.

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Rejection of Independent Claim 92:

With respect to the rejection of independent claim 92, Applicants submit that the combination of Secor, Tuck and Nishimura does not disclose or suggest or render obvious the claimed vision system. Again, Applicants submit that Nishimura does not remediate or fill in what is missing from Secor and Tuck. As discussed above, the mere fact that Nishimura discloses a wide display screen does not, either alone or in combination with Secor and/or Tuck, render obvious the presently claimed invention. There is no disclosure or suggestion in Nishimura of a display system which displays a composite image synthesized from image data captured by two or more image capture devices without duplication of image information, and with the display system displaying such a composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, and with the displayed image including an image portion from an image captured each of the two or more image capture devices.

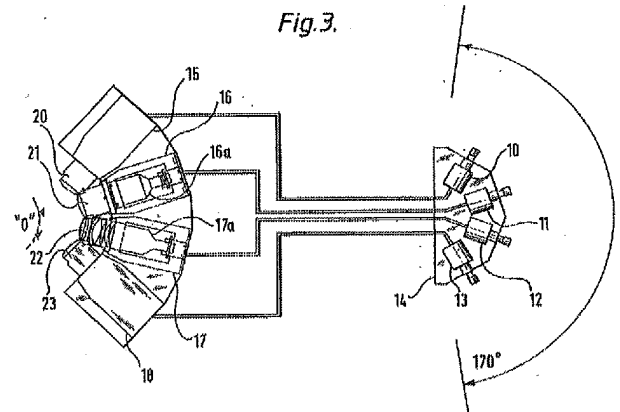
Also, and as discussed above and in the previous Responses, Secor does not disclose or suggest, for example, a vision system with a display system displaying a composite image (synthesized from image data captured by two image capture devices without duplication of image information) on a single display screen of the vehicle that is viewable by the driver of the vehicle. To the contrary, Secor discloses a plurality of LCD screens (40, 42, 44), with each screen displaying a view from the respective camera (and optionally switching between a side-rear view camera and a side-looking camera). Thus, Secor teaches away from presently claimed invention of independent claim 92. Further, the Office Action acknowledges that Secor does not disclose a synthesized image and non-parallel axes as claimed, and cites to Tuck for support of the rejection.

Tuck Discloses Multiple Displays for Respective Multiple Cameras:

As also discussed in the previous Responses, Tuck discloses a display system for a tank that includes individual display units mounted side-by-side, each having a respective television camera associated therewith so that a substantially continuous picture of at least part of the

surrounding panorama can be reconstructed and viewed by an observer.²⁶ See, for example, the Abstract and Figure 3 of Tuck, reproduced to the right. As can be seen in Figure 3 of Tuck, each camera 10, 11, 12, 13 is associated with a respective display generator 15, 16, 17, 18, which display the respective images to the observer "O" through respective magnifying lenses 20, 21, 22, 23. There is no

disclosure or suggestion in Tuck of a display system that displays a composite image synthesized from image data captured by the image capture devices without duplication of image information, and with the display system displaying the composite image on a *single* display screen of the vehicle. Nor is there a disclosure or suggestion in Tuck of the display system displaying a displayed image on a single display screen that includes an image portion from an image captured by each of the image capture devices or cameras. Moreover, Applicants submit that Tuck teaches away from such a vision system by teaching that each of the individual display units has a respective television camera associated therewith, such that an image captured by each television camera is displayed on its respective associated display unit such that the displayed image on one of the individual display units cannot have an image portion from an image captured by each of the image capture devices.²⁷



The disclosure cited in Tuck thus falls well short of disclosing or suggesting or rendering obvious the presently claimed invention of claim 92, which includes the following limitations:

a display system which displays a composite image synthesized from image data captured by said image capture devices without duplication of image information, said display system displaying said composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, the displayed image including an image portion from an image captured by each of said image capture devices.

²⁶ Lynam Declaration, par. 39.

²⁷ Lynam Declaration, pars. 41, 42 and 44-47.

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Nowhere in the applied references is there a disclosure or suggestion of a display system that displays a composite image synthesized from image data captured by side and center image capture devices without duplication of image information, with the display system displaying the composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, and with the displayed image including an image portion from an image captured by each of the side and center image capture devices. Clearly, if one of ordinary skill in the art were to follow the teachings of the functions of the Secor and Tuck and Nishimura systems, one of ordinary skill in the art would have been led towards use of a display screen or screens to display an image from a single respective camera or to display separate and distinct and isolated and/or demarcated images from opposite facing side cameras.²⁸ There is absolutely no disclosure or suggestion in the applied references of displaying a composite image synthesized from image data captured by three image capture devices without duplication of image information and displaying the composite image on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, with the displayed image including an image portion from an image captured by each of the three image capture devices. The results that would be expected from the combination asserted by the Examiner would be to have a separate displayed image or display for each respective camera or a display. It would clearly have been unexpected and non-obvious to one of ordinary skill in the art, armed with the proposed combination of applied references, to provide a single display screen for displaying a composite image synthesized from image data captured by three cameras without duplication of image information, with the displayed image including an image portion from an image captured by each of the three image capture devices.²⁹ Plainly, since an artisan armed with Secor would either be displaying a camera image on a respective screen or switching the display between the cameras, there would not have been a motivation to combine the teachings of Secor with those of Tuck (multiple cameras with multiple respective displays) or

²⁸ *Lynam Declaration*, pars. 41, 42 and 44-47.

²⁹ *Lynam Declaration*, pars. 41, 42 and 44-47.

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Nishimura (separate images on wide display). Nor would there have been a reasonable expectation of success in combining the non-related teachings of the applied art.³⁰

Therefore, Applicants respectfully submit that the combination of Secor, Tuck and Nishimura does not disclose or suggest or render obvious the vision system of the presently claimed invention, particularly as set forth in independent claim 92 and the claims depending therefrom. Reconsideration and withdrawal of the rejection of claims 92-98 is respectfully requested.

Rejection of Dependent Claims 93-98:

Applicants submit that dependent claims 93-98 are patentable for at least the reasons set forth above with respect to independent claim 92.

With respect to the rejection of dependent claim 95, Applicants submit that, contrary to the assertion in the Office Action, Tuck does not disclose a composite image indicating a view from a single location. In rejecting claim 95, the Office Action merely states:

Regarding claim 95, Tuck discloses "one of: composite image approximates a view from a single location" (Tuck: figure 4; column 4, lines 63-67, wherein the composite image indicates a view from a single location).

First, as discussed above, Tuck discloses use of a plurality of displays, with each display displaying an image from a respective camera, and Tuck does not disclose display of a composite image as claimed herein. Moreover, column 4, lines 63-67 of Tuck states:

of illustration only. It will be seen that the view is made up of four separately obtained pictures of the surrounding panorama, each picture obtained by a respective camera and displayed by a respective CRT and biocular magnifier 20, 21, 22 and 23. Although in the drawing,

³⁰ Lynam Declaration, pars. 41, 42 and 44-47.

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Claim 95 states: "wherein at least one of (a) said center image capture device has a horizontal field of view that is generally symmetrical about the longitudinal axis of the vehicle and wherein said displayed composite image approximates a view from a single location and (b) said displayed composite image approximates a view from a single location." Nowhere in Tuck, and particularly in the cited passage above, is there a disclosure or suggestion of a composite image on a single display or a composite image that indicates a view from a single location. Each individual picture in Tuck is captured by a respective camera and is displayed on a respective CRT. Thus, there is no composite image as claimed herein in Tuck (independent claim 92, from which claim 95 depends, states: "a display system which displays a composite image synthesized from image data captured by said image capture devices, said display system displaying said composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, the displayed image including an image portion from an image captured by each of said image capture devices"), so Tuck (taken alone or in combination with the other applied art) cannot disclose or suggest or render obvious such a composite image that indicates a view from a single location.

With respect to the rejection of dependent claim 97, claim 97 includes "an electronically generated graphic overlay seen superimposed on said displayed composite image in order to enhance the driver's ability to maneuver rearwardly." The Office Action merely cites to column 5, lines 20-22 of Tuck, which states:

When used in warfare or training roles the display system can be usefully provided with weapon aiming data which can be overlaid on the display, since the minimal resultant distortion achieved by the system can reduce sighting errors.

There is no disclosure or suggestion in Tuck of an electronically generated graphic overlay superimposed on a displayed composite image in order to enhance the driver's ability to maneuver rearwardly. To the contrary, Tuck discloses individual images displayed on respective individual displays with *weapon aiming data* overlaid on the display. The Office Action again

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falls well short of the requirements for establishing a *prima facie* case of obviousness of a claimed invention of dependent claim 97.

Rejection of Independent Claim 99:

With respect to the rejection of independent claim 99, Applicants submit that the combination of Secor and Tuck and Nishimura does not disclose or suggest or render obvious the claimed vision system for at least the reasons set forth above with respect to the rejection of independent claims 50 and 92 and dependent claim 97. Reconsideration and withdrawal of the rejection of independent claim 99 and claims 100 and 101 depending therefrom is respectfully requested. Applicants have amended claim 101 to include only its limitations (a)-(d) above and have added new claims 119-122 to separately include the other limitations from the previous version of claim 101. Applicants submit that claims 101 and 119-122 are allowable over the applied art and consideration of these claim limitations and withdrawal of the rejection of claim 101 is respectfully requested.

Rejection of Independent Claim 102:

With respect to the rejection of independent claim 102, Applicants submit that the combination of Secor and Tuck and Nishimura and Kishi et al. does not disclose or suggest or render obvious the claimed vision system for at least the reasons set forth above with respect to the rejection of independent claims 50 and 92. Reconsideration and withdrawal of the rejection of independent claim 102 and claims 103 and 104 depending therefrom is respectfully requested.

Rejection of Dependent Claims 103-104:

Applicants submit that dependent claims 103 and 104 are patentable for at least the reasons set forth above with respect to independent claim 102.

With respect to the rejection of dependent claim 103, claim 103, as rejected, included "wherein the image portion from said center image capture device is compressed, and wherein at least one of (a) said image portion from said center image capture device is vertically

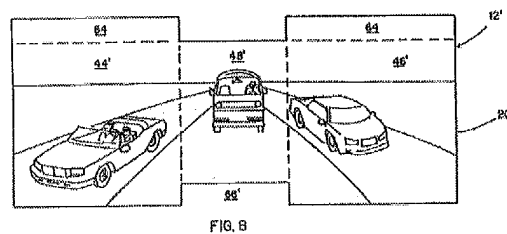
compressed, (b) values of adjacent pixels are adjusted as a function of pixel values of removed lines and (c) said image portion from said center image capture device has a vertically central portion and vertically upper and lower portions, wherein said upper and lower portions are laterally wider than said central portion." In rejecting claim 103, the Office Action merely states:

Regarding claim 103, although not disclosed, it would have been obvious to vertically compress the image (Official Notice). Doing so would have been obvious in order to reduce that data size of the overall image).

Thus, the Office Action acknowledges that the claimed subject matter of claim 103 is not disclosed, yet rejects it as being obvious. However, the claimed invention of claim 103 does not have the center image portion vertically compressed to "reduce the data size of the overall image". To the contrary, the vertical compression of the present application functions to (as stated in the present application) "substantially eliminate[s] distortion resulting from the spatial separation between the cameras and can be readily accomplished. In an illustrated embodiment, the image compression is carried out by removing selective ones of the scan lines making up the image portion. A greater number of lines are removed further away from the vertical center of the image."

Such a configuration is shown in Figure 8 of the present application, reproduced to the right. The vertical compression thus functions to configure the center image portion to correspond with the side image portions when the synthesized composite image is displayed on the single

display. Such a configuration is not disclosed or suggested or rendered obvious by the disclosure of the applied art, and the Office Action's official notice cites to no support for the rejection and thus falls well short of the requirements for establishing a *prima facie* case of obviousness of a claimed invention of dependent claim 103. Applicants have amended claim 103 to include only the limitation (a), and have added new claims 123 and 124 to include limitations (b) and (c), respectively. Applicants respectfully request consideration of each of these limitations and allowance of claims 103, 123 and 124.



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Rejection of Independent Claim 105:

With respect to the rejection of independent claim 105, Applicants submit that the combination of Secor and Tuck and Nishimura and Kishi et al. does not disclose or suggest or render obvious the claimed vision system for at least the reasons set forth above with respect to independent claims 50, 92 and 99. As discussed above, neither Secor nor Tuck nor Nishimura disclose or suggest, for example, a vision system for a vehicle having a gear actuator and comprising two image capture devices positioned on the vehicle and directed rearwardly with respect to the direction of travel of the vehicle, with a display system that displays a composite image synthesized from image data captured by the image capture devices without duplication of image information, and with the display system displaying the composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, and with the displayed composite image displayed on the single display screen including an image portion from an image captured by each of the two image capture devices, with the displayed image including an image portion from an image captured by each of the image capture devices. Likewise, Kishi et al., taken alone or in combination with the other applied art, does not disclose or suggest such a vision system. Further, Applicants submit that the combination of Secor and Tuck and Nishimura and Kishi et al. does not disclose or suggest or render obvious such a vision system having, for example, an electronically generated graphic overlay that enhances the driver's understanding of what is in the area adjacent the vehicle, and that is seen superimposed on the displayed composite image, and with the graphic overlay enabled when the vehicle's gear actuator is selected to be in reverse gear. Reconsideration and withdrawal of the rejection of independent claim 105 and claims 106-109 depending therefrom is respectfully requested. Applicants have amended claim 108 to include only the limitations (a) and (b) above and have added new claims 110-114 to separately include the other limitations of the previous version of claim 108. Applicants submit that claims 108 and 110-114 are allowable over the applied art and consideration of these claim limitations and withdrawal of the rejection of claim 108 is respectfully requested.

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Accordingly, Applicants respectfully submit that Secor and/or Fukuhara and/or Nishimura and/or Tuck and/or Kishi et al., either alone or in combination with one another or with other prior art of record, do not disclose, teach, suggest or render obvious the vision system of the present invention, particularly as set forth in independent claims 50, 92, 99, 102 and 105 and in the claims depending therefrom.

Secondary Considerations and Objective Evidence of Non-Obviousness:

Applicants submit herewith the declaration of Dr. Niall R. Lynam, who is at least one of ordinary skill in the field of the presently claimed invention.³¹ Dr. Lynam's declaration discusses evidence of the commercial success of the presently claimed invention, and includes factual evidentiary documents (see Exhibits A-E of the Lynam Declaration) that show the commercial success of the Schofield et al. vision system, which is claimed herein. As shown in Exhibit A of the Lynam Declaration,³² the vision system (shown at right) includes a plurality of cameras and a display screen displaying a synthesized image, without duplication of image information, and with the synthesized image displayed as a single image on a single display screen (see Merged Image of Figure 2 to the right) that is viewable by a driver of said vehicle when the driver is normally operating said vehicle, with the displayed image displayed on the single display screen including an image portion from an image captured by each of the image capture devices (see Left Camera Image, Center Camera Image and Right Camera Image to the right). Thus, clearly,

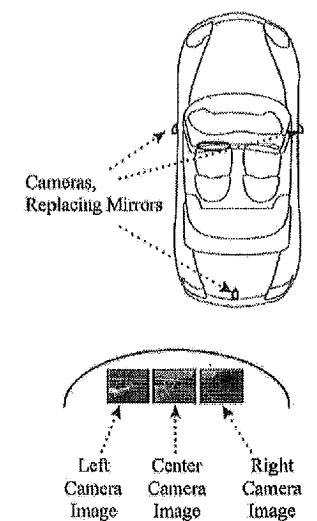


Figure 1. Camera Location and Multiple Display Option

Merged Image. - Another option is to merge the three camera images into a single integrated image to be viewed on a single display. This approach is illustrated in Figure 2. In this example, three camera images are used to synthesize a virtual image that shows the entire scene to the rear of the vehicle. In this synthesized image the redundant information from the three images is eliminated. In addition, information from all three image sources is placed in the appropriate relative perspective providing drivers intuitive, visual information about their surroundings.

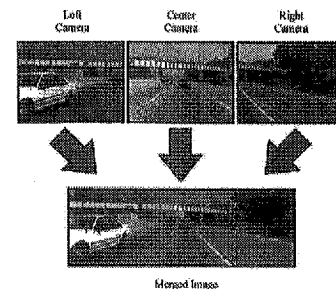


Figure 2. Merged Image Example

This architecture has the cost advantages of a single display while providing two distinct advantages:

- Full coverage of the rearward scene - eliminating any significant blindspots and the requirement for drivers to direct their eyes to specific locations
- Integration of all information relating to the rear scene into a single image - eliminating the need to check and integrate multiple sources of information

It is these advantages that more than compensate for the system's loss of depth cues and limited resolution, resulting in a cost effective improvement to traditional rear view systems.

³¹ Lynam Declaration, pars. 3-12.

³² Lynam Declaration, par. 14, Lynam Exhibit A.

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the vision system of Lynam Exhibit A (and as discussed in Lynam Exhibits B-E) is exemplary of the claimed vision system of the present application.

Plainly, the use of the Schofield vision system by the likes of General Motors and Renault is evidence of the commercial success of the presently claimed invention. The Schofield vision system was shown at prestigious events and the shown Schofield vision system utilized the vision system claimed herein, with the claimed elements of the claimed vision system being important elements in the success of the concept vehicles shown.³³ To have the so selected and so used claimed vision system shown at such prestigious events and implemented as part of new pioneering concept vehicles, clearly evidences the pioneering and novel and non-obvious aspects of the claimed invention.³⁴ And the praise and accolades given by the experts upon review of the claimed vision system is further evidence of the pioneering and novel and non-obvious aspects of the presently claimed invention.³⁵

Thus, commercial success can be presumed here.³⁶ Lynam Exhibit E is an article from The Auto Channel that touts the Schofield et al. vision system on a Renault Talisman concept car at the Frankfurt Motor Show in 2001 (the Frankfurt Motor Show is one of the largest international auto/motor shows and is often a showcase for cutting edge/pioneering technology).³⁷ Renault's election to use the Schofield vision system (and not the prior art like Secor or Nishimura or Tuck) in their Talisman vehicle is telling. Renault was the consumer and it was free to choose a rear vision system on the basis of objective principles and the objective

³³ *Lynam Declaration*, par. 25.

³⁴ *Lynam Declaration*, par. 25.

³⁵ *Lynam Declaration*, par. 25, Lynam Exhibits B, D and E.

³⁶ *Ormco Corp. v. Align Technology Inc.*, 79 USPQ2d 1931, 1941 (Fed. Cir. 2006). (As we explained in *J.T. Eaton & Co. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563 (Fed. Cir. 1997), '[w]hen a patentee can demonstrate commercial success, usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention.' *Id.* at 1571; see also *Brown & Williamson*, 229 F.3d at 1130 (stating the presumption that commercial success is due to the patented invention applies 'if the marketed product embodies the claimed features, and is coextensive with them.')).

³⁷ *Lynam Declaration*, par. 18, Lynam Exhibit E.

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principle it chose to follow was to use the Schofield vision system that Renault had already seen to work well on General Motors' Precept vehicles (see Lynam Exhibits C and D of the Lynam Declaration).³⁸ In this case, Renault chose to use the Schofield vision system in accordance with the claims of the present application, and no other. Thus, the commercial success achieved by the assignee of the present application with the Renault Talisman vehicles that used the Schofield vision system is not the result of heavy promotion or advertising, or a shift in advertising, and is not the result of consumption by purchasers tied to the assignee of the present application (neither General Motors nor Renault is tied to the assignee of the present application, and neither General Motors nor Renault has a vested interest in the outcome of this patent prosecution), and is not the result of other business events beyond Renault's desire to use the proven Schofield vision system.³⁹ Therefore, the commercial success with the Renault Talisman vehicles is directly derived from the invention claimed.

The commercial success of the Schofield vision system is thus unassailable. Renault wanted the proven success and reliability and performance of the rear vision system of the Renault Talisman vehicles to match that of the proven prior General Motors Precept rear vision system, and thus chose the Schofield vision system.⁴⁰

Thus, the commercial success of the Schofield vision system is derived from the use of the Schofield claimed invention by both General Motors and Renault. The commercial success is not due to a vehicle or system designed by General Motors or Renault, but is due to the vision system invented by Schofield et al. and used by General Motors and Renault in their Precept and Talisman vehicles, respectively.⁴¹ The design and performance of the Schofield vision system were conceived and developed by Donnelly and not by General Motors or Renault. The nexus between the implementation of the claimed invention and the commercial success thus is not shown by a high volume of sales of the such systems, but also by Renault contracting

³⁸ *Lynam Declaration*, pars. 16, 17, 22 and 23, Lynam Exhibits B-D.

³⁹ *Lynam Declaration*, par. 24.

⁴⁰ *Lynam Declaration*, par. 24.

⁴¹ *Lynam Declaration*, pars. 14-24, Lynam Exhibits A-E.

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the assignee of the present application to design and implement the Schofield vision system in the first place (before a single system was actually installed and sold on a Renault vehicle).⁴²

It will also be understood that the success of the claimed invention for use in such rear vision systems is directly related to the *performance* in the field of the vision systems manufactured in accordance with the claimed invention.⁴³ In terms of business awards by automakers, advertising or the like by suppliers do not typically play a role in winning business, and thus the use of the Schofield vision system on the Precept and Talisman vehicles is based on the technical merits of the claimed Schofield vision system invention.⁴⁴ The OEM market and supplier market is relatively small and extraordinarily competitive – so neither advertising, ties to the supplier, nor other similar business reasons have bearing on the choice of rear vision system for such applications.⁴⁵ It was General Motors' and Renault's desire for the performance of the Schofield vision system and not merely some increasing popularity of a particular vehicle model, or the effectiveness of any marketing efforts involved, that drove to the selection of the Schofield vision system for the Precept and Talisman vehicles.⁴⁶ Accordingly, a direct nexus exists between the vision systems manufactured in accordance with the claimed invention and their commercial success.⁴⁷

Applicants herein offers proof that the use made by the assignee of the present application were a direct result of the unique characteristics of the claimed Schofield vision system invention - as opposed to other economic and commercial factors unrelated to the quality

⁴² *Lynam Declaration*, pars. 24 and 25

⁴³ *Lynam Declaration*, par. 22.

⁴⁴ *Lynam Declaration*, par. 22.

⁴⁵ *Lynam Declaration*, par. 22.

⁴⁶ *Lynam Declaration*, par. 22.

⁴⁷ *Iron Grip Barbell*, 392 F.3d at 1325, 73 USPQ2d at 1230. "Ordinarily, this nexus may be inferred when 'the patentee shows both that there is commercial success, and that the thing (product or method) that is commercially successful is the invention disclosed and claimed in the patent'", quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392, 7 USPQ2d 1222, 1229 (Fed. Cir. 1988).

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of the patented subject matter.⁴⁸ Applicants also respectfully submits that the evidence presented in the incorporated Declaration and Exhibits A-E does far more than merely submit evidence of sales. The driving force behind those sales is clearly evidenced herein.

While there may be many reasons why a consumer may choose to use a vision system in the Precept or Talisman vehicle, there is one reason that Renault chose to include the Schofield vision system in their Talisman vehicles --- and that reason is that by the time Renault began to design its vehicle and vision systems, the Schofield vision system had already been a proven success on the General Motors Precept vehicle, and so the Schofield vision system is what Renault wanted to use in their vehicle.⁴⁹

The nexus between the merits of the Schofield vision system and Renault's use of the Schofield vision system is clear and compelling. The Lynam Declaration is supported with objective evidence, is not a conclusory opinion, and is replete with factual evidence.

Further, additional evidence of the non-obviousness of the presently claimed invention includes the high praise that the Schofield vision system of the presently claimed invention was given, which is in and of itself strong evidence of the unexpected results of the system that is disclosed and claimed in the present application.⁵⁰ Also, the systems disclosed in the likes of the applied art of Secor and Nishimura and Tuck, constitute failed attempts by others to conceive and develop a rear vision system that would provide a display of a rearward view in a meaningful manner that would not distract the driver while the driver is operating the vehicle, such as during a reversing maneuver.⁵¹ Otherwise, and logically, it would have been the likes of the applied art of Secor, Nishimura and/or Tuck that would have been used by leading

⁴⁸ *In re DBC*, 89 USPQ 1123, 1130-31 (Fed Cir. 2008) ("the proponent must offer proof 'that the sales were a direct result of the unique characteristics of the claimed invention - as opposed to other economic and commercial factors unrelated to the quality of the patented subject matter.' *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996); see also *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995) ('For objective evidence to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.').")

⁴⁹ *Lynam Declaration*, pars. 22-24 and 48.

⁵⁰ *Lynam Declaration*, par. 26.

⁵¹ *Lynam Declaration*, pars. 19 and 27.

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automakers for their concept vehicles, and such would have occurred (but did not occur) years earlier than the filing date of the Schofield priority application.⁵² Use of the Schofield vision system on the likes of the concept Precept and Talisman vehicles, several years after the initial filing of the priority application, itself evidences the skepticism of experts for what went before, and thus reinforces the innovativeness of the Schofield claimed vision system.⁵³

The abundance of secondary considerations evidenced herein show that the combination of features that collectively and combined together constitute the presently claimed invention would not in 1995 have been predictable to one of ordinary skill in the art.⁵⁴ Indeed, the commercial success of what Schofield et al. invented evidences the uniqueness and innovativeness of the presently claimed invention.⁵⁵

Conclusion:

Claims 50-52, 56, 58, 62, 67 and 92-133 are pending in the present application. Applicants submit that the Office Action has failed to establish a *prima facie* case of obviousness of claims 50-52, 56, 58, 62, 67 and 92-109 in view of the combinations of Secor with Fukuhara, Nishimura, Tuck and/or Kishi. Whether considered alone or together, the references of record are devoid of any discussion or suggestion of the subject matter recited by claims 50-52, 56, 58, 62, 67 and 92-109. Moreover, the references lack motivation for the applied combinations, and the prior art, as a whole teaches away from the combinations recited by the claims. The rejection of claims 50-52, 56, 58, 62, 67 and 92-109 appears to be nothing more than a hindsight reconstruction of the claimed invention. Finally, secondary considerations heavily weigh in favor of a finding that claims 50-52, 56, 58, 62, 67 and 92-109 are not obvious.

⁵² Lynam Declaration, par. 27.

⁵³ Lynam Declaration, par. 28.

⁵⁴ Lynam Declaration, pars. 29 and 43.

⁵⁵ Lynam Declaration, pars. 29 and 43.

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Applicants respectfully submit that Secor, either alone or in combination with Fukuhara, Nishimura, Tuck and/or Kishi and/or other prior art references of record, does not disclose or suggest or render obvious to one of ordinary skill in the art the combination of features that collectively and combined together constitute the claimed subject matter of the vision system as claimed herein. Applicants thus respectfully submit that claims 50-52, 56, 58, 62, 67 and 92-133 are in condition for allowance and a notice to that effect is earnestly and respectfully requested.

Respectfully submitted,

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